BEYOND THE HLA/HCN HEALTH INFORMATICS INNOVATION AWARD

CARESEARCH REVISITED

In 2012, **Sarah Hayman** and the CareSearch team received the HLA/HCN Health Informatics Innovation Award, acknowledging the health information provision work done by the CareSearch Palliative Care Knowledge Network. Here Sarah reports on the professional development she and her colleagues have undertaken following receipt of what she describes as 'this wonderful award' and their hope that they can 'extend the knowledge of the evidence based methodology in our work to benefit the profession more widely'.

CareSearch and search filters

By way of background, I will give a brief overview of CareSearch and its information approach. More information can be found on the CareSearch website [1] and by contacting me or my colleagues via the website. CareSearch is funded by the Australian Department of Health and Ageing to provide a suite of evidence-based information for all those working in palliative care, as well as palliative care patients, and their families, friends and carers. An underpinning principle of CareSearch's service, and a point of difference in our approach from some other health information services that may be found on the web, is the emphasis on high quality evidence-based information. Resources within the CareSearch website have been written or evaluated by expert palliative care clinicians. One important means of delivering palliative care evidence to our users is through the development and application of search filters, designed to search PubMed and link users to palliative care and associated information.

Search filters are evidence based literature search strategies, objectively derived using an explicit methodology and tested using a gold standard test comparison study design. A search filter provides a standardised, systematic search with a known level of performance.[2] Embedding the search filter into a URL for a database such as PubMed gives users access to a highly performing literature search simply by clicking a link.

CareSearch search filters have been developed in Ovid

Medline, using a validated methodology, which has been outlined in several published articles.[3,4,5] These search filters are then translated for PubMed using another validated methodological approach.[6] Validated search filters have been developed internationally for a number of years; however these are largely methodological search filters (intended to find references for certain study designs such as systematic reviews, or references dealing with aspects of health care such as therapy, diagnosis and etiology). The search filters developed by CareSearch (and the project Flinders Filters which has grown out of the CareSearch search filter development work) are topic based search filters; that is, they are designed to retrieve references relating to a specific topic within heath care.

The first search filter developed by CareSearch was the Palliative Care Search Filter. The researchers and librarians within the team developed this search filter in 2006 [3] to enhance access to evidence of high quality. The aim was to facilitate more comprehensive and routine retrieval, for health librarians and for clinicians, academics and researchers. This was done by using an evidence-based search filter, developed with a detailed and intensive research methodology, to enable automated real-time retrieval of relevant literature. Palliative care is a diffuse field involving practitioners in medicine, nursing and allied health, and the literature and evidence about this field are correspondingly diffuse and can be hard to search effectively. The search filter is available free of charge on the CareSearch website where it is part of a suite of services designed to support knowledge translation in the palliative care

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field. The filter can be used with one click to search for all palliative care information, or for more than 60 special topics within the field. It can also be used as a base for users to build their own customised searches, and instructions are supplied for this.

CareSearch and the associated Flinders Filters Project have continued to develop search filters. Current search filters now include: Palliative Care, Heart Failure, Lung Cancer, Primary Health Care, Residential Aged Care, Contraception, Dementia and Aboriginal and Torres Strait Islander Health Care. The Bereavement Search Filter is under development. The search filters may be found and used on the CareSearch website or the Flinders Filters website.[7]

The Flinders Filters project grew out of the CareSearch project as a result of the need to support and further this work as an area of research.

Professional development for and by CareSearch and Flinders Filters librarians

As the specialist librarian within the CareSearch team, I have, together with my librarian colleagues in the Flinders Filters team (Raechel Damarell, Mikaela Lawrence and Yasmine Shaheem, with assistance from Bronwyn Lloyd, Sarah Reed and Sonia Witzmann), continued to create topic-based search filters and to develop and research aspects of the methodology we employ to do this. We do this under the leadership of Dr Jennifer Tieman (CareSearch Director and Chief Investigator of Flinders Filters) and Dr Ruth Sladek, (Chief Investigator of Flinders Filters).

The new search filters, developed since the award, include: Aboriginal and Torres Strait Islander Health; Contraception; Residential aged care; Dementia and Bereavement (under development). We have continued to extend our understanding of the methodology employed and to investigate different aspects of the search filter development process.

We document all the development work we undertake and aim to publish articles on each search filter developed. The articles are of two broad types. The first type is aimed for users, to promote awareness of the search filter now available for their topic of interest and to provide information that explains the complexity and validity of the process used to develop the search filter. It is important for users to understand both the usefulness and the trustworthiness of the search filters and their associated topic searches.

The second type of article produced by members of the CareSearch and Flinders Filters teams is a scholarly detailed paper on the methodology of the search filter development process. There is a list of these articles available on the CareSearch website.[8] They are time-consuming and challenging to write, as they are submitted to peer-reviewed journals; however they are an important part of the evidence-based process of search filter development. Our search filters are transparent and open to scrutiny by our expert peers within the field of bibliometrics. The time lag in publishing these articles also means that while the search filters can be made available very quickly after development, the literature about the search filters may not appear for some time afterwards. However, the research and writing process is a very important part of the search filter development work undertaken at CareSearch and Flinders Filters and is a significant aspect of professional development for librarians working in our teams.

An aspect of our approach to professional development has been to investigate how elements of the technical search filter development work that we do at CareSearch could be more widely applied to

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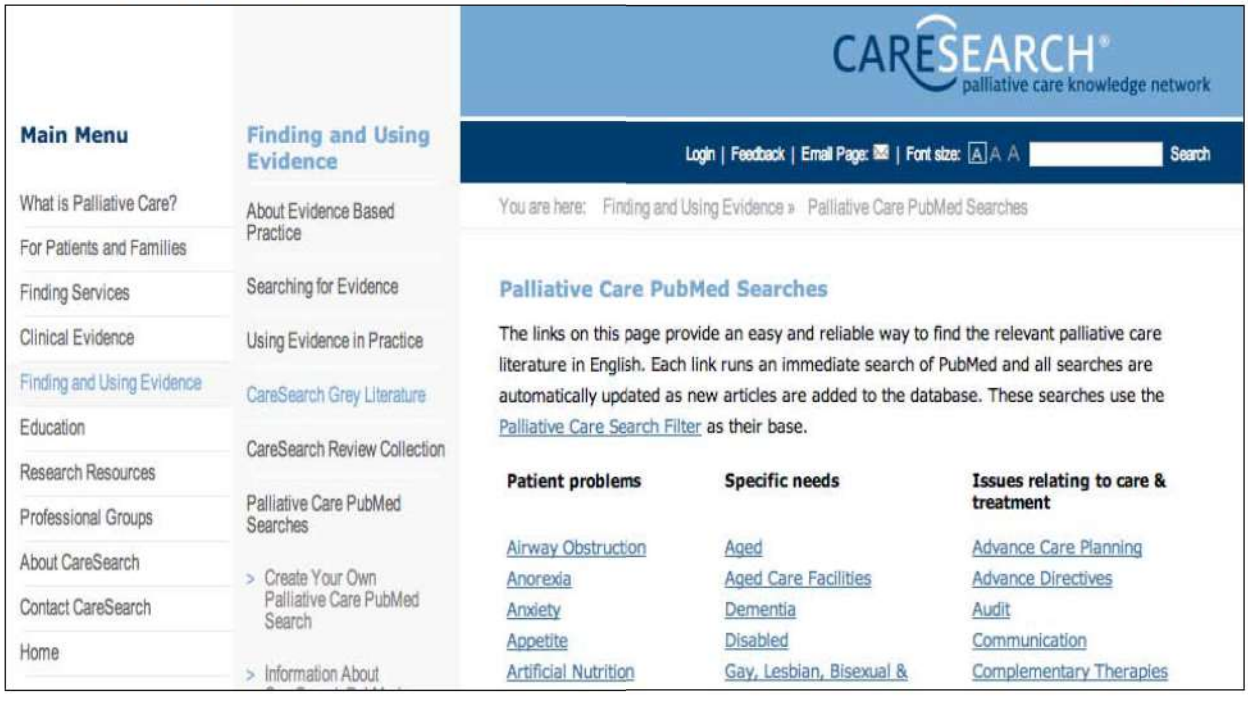

searching generally for the library profession and in particular for health librarians. Searching is a very significant part of the work of health library professionals and they have a recognised high degree of expertise in it.[9] However, as Lasserre has stated "The search may be expertly performed; however, this cannot be assumed if the librarian has no accredited search qualifications, no requirement for ongoing knowledge and skills-based professional development, no obligation to follow validated standards, guidelines and transparent reporting processes, or need to undergo independent evaluation."[10] We believe that any level of expertise can be enhanced by the application of some evidence-based techniques. Importantly we also believe that the application of an evidence-based approach to test and validate searching effectiveness can result in useful evidence that librarians can use to demonstrate their expertise. In these times of tight funding and a need to demonstrate return on investment this could be a very useful addition to a librarian's armoury of evaluation tools.

With all this in mind, and as part of my own professional development as well as providing some for my professional colleagues, I have presented sessions on searching at the HLA Professional Development Days in 2012 and 2013. In 2012 I presented a session on evidence based systematic searching, where I gave an overview of important aspects of systematic searching. I introduced search filters and the idea of an iterative approach to developing a search strategy using some elements of our search filter development methodology to test and validate strategies.

In 2013 I presented a session looking in more detail at search filters: what they are; how they work; how they are developed and how they should be used. I also looked in more detail at four key elements of the process of search filter development and suggested that aspects of each of these components could be taken and applied to the development and validation of an expert search in general library practice. Note that it is very important to distinguish between an objectively derived search filter that has been developed using the validated and published methodology and an expert search, which may been developed using only some elements of the full search filter development model.

The next step in our professional development journey, following the receipt of this award, is to develop some online learning modules for librarians that we will make available via CareSearch or Flinders Filters. These will be available free for the use of health librarians, other librarians, researchers and anyone interested in developing and enhancing their searching skills. They will look at each of the four components of the search filter development process that we have identified as of potential applicability to general literature searching. These are:

1. Collaboration with expert advisors

In the full search filter development model, an expert advisory group is created, consisting of clinicians, researchers or policymakers with expertise in the topic in question. This group provides advice on scope and boundaries of the topic; relevant terminology; key data sources; key published works and journals and also ratifies the choice of a gold standard reference set. They also undertake screening of references for relevance throughout the search filter development process.

We suggest that even one expert in the field of your search question can provide useful advice about information sources, terminology, and key references that can be used to guide and validate a search. An expert (or several) can provide you with references that your search should retrieve. If your search does not retrieve them you can analyse why it did not and adjust your strategy. The expert or experts may also be prevailed upon to screen a sample set of retrievals to help you assess the precision of your search strategy.

2. Development of a representative reference set

In the full search filter development model, this step is the creation and use of a gold standard set of references that are confirmed (by the expert advisory group) as representative of the field for the topic in question. This set is divided onto three subsets (the term identification set, the filter development set and the filter validation set) in order that the filter can be built and tested in different datasets, to minimise bias.

We suggest that the creation of a reference set for your search, or references that you have had externally validated as relevant (perhaps by an expert, perhaps a set of references from a seminal published text) can assist you in developing and testing a search strategy. If you can demonstrate that your search strategy retrieves a high percentage of a set of references that are known to be relevant, then you can demonstrate the sensitivity of your search strategy.

3. Term identification and frequency analysis

In the full search filter development model, we do extensive analysis to determine the candidate terms for the search filter. These terms are then exhaustively tested, singly and in combination, to derive the best performing combination.

Without following the full model, it would be possible to develop a set of likely terms by using frequency analysis software (e.g. Concordance or Writewords) and identify the terms that appear in the literature of your topic with high frequency. We will demonstrate this in the online module.

4. Testing and validation

Iterative testing and validation is at the heart of the search filter development process we use at CareSearch and Flinders Filters. We

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undertake many testing approaches, including the following: testing a set of retrievals for relevance by sending them to members of the expert advisory group; analysing items in the gold standard set that were not retrieved by our draft search strategy; "NOTing out" items retrieved by one strategy and comparing them to those retrieved by another; calculating the percentages retrieved within known sets to measure sensitivity.

We suggest that elements of these testing and validation approaches can be applied to any expert search development process and we will demonstrate examples of this in the online modules.

As these modules are created, we will be keen to receive feedback on them in draft form from our colleagues in the health library profession. We will let people know via the HLA mailing list and other channels that they will be available for testing and comment. If you are interested in being involved as a tester and critical friend, please contact me (see details below). We would be delighted to have your input so that we can make these as useful as possible to the profession.

Finally, I would like to say that the opportunity of enhancing our professional development as a result of winning the HLA/HCN award has enabled our whole team to benefit in unexpected ways. We already talk regularly amongst ourselves as we wrestle with knotty problems in understanding and exploring the methodology in this evolving area. Being librarians, we always enjoy a collaborative approach and we are aware that we are very fortunate to have the luxury of investigating in depth information retrieval which is at the heart of our profession. However this question of how we can share our knowledge more widely with the whole library profession has caused us to reflect much more deeply on our practice and how it can potentially assist others. Ideally, of course, what we hope to offer are techniques for improving searching practice that can be used by librarians, researchers and clinicians generally, leading to the important result of better health outcomes for all.

Sarah Hayman
Research Fellow (Evidence), CareSearch
sarah.hayman@flinders.edu.au

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